

Reducing catering costs through energy efficiency

A guide for kitchen designers, contract caterers and operators

- Increased profits/savings
- More comfortable working conditions



ENERGY EFFICIENCY

**BEST PRACTICE
PROGRAMME**

CASE STUDY 1 – HM PRISON LINCOLN

HM Prison Lincoln is a large Victorian prison housing 650 inmates. The prison kitchen is old, although a number of fairly modern items of catering equipment have been installed – such as two 20-rack gas-fired combi-ovens.

The kitchen is run by a relatively small team of dedicated prison catering staff, with most kitchen duties performed by inmates.

Two or three cooked meals are prepared each day for the inmates – a total of over half a million meals per year. The catering energy bill was £46 000 per year before savings were implemented.

An energy specialist carried out a detailed survey of the kitchen and identified the following saving opportunities.

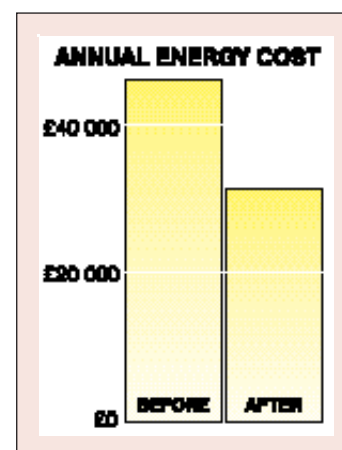
- A four-oven, gas-fired flat-bed oven was fired up for 14 hours a day, but for a substantial amount of this time no baking was being carried out. Warm-up time was long (three to four hours) and there was a natural inclination, once the working temperature had been reached, to leave the oven switched on. It was proposed that the flat-bed oven be removed and replaced by another 20-rack gas-fired combi-oven.
- Standard 38 mm tubular fluorescent lights were used throughout the kitchen and storage areas. Replacement with 26 mm tubes, and cleaning the diffusers and reflectors, enabled the number of lamps to be reduced by 25%.
- Fan-assisted unit heaters, fed from the prison steam supply, were in operation for 24 hours a day throughout the heating season. Fitting time switches and isolating valves to the heaters meant they could be switched off at night and when the kitchen was unoccupied, resulting in substantial savings.



- Several walk-in refrigerators and a freezer often had doors left open, allowing heat ingress. Also, door seals had been damaged when moving pallet-loads of produce into the refrigerators. Fitting automatic closing devices to the doors and replacing the damaged door seals helped to produce worthwhile energy savings.

Overall energy savings resulting from the survey were very high, producing savings of £14 700 a year, and a payback on investment of less than one year.

Measure	Saving per year (£)	Investment required (£)
Replace old flat bed oven, with 3-4 hour warm-up time, with combi-oven	4800	10 000
Replace 38 mm fluorescent tubes with 26 mm	2000	900
Replace damaged refrigerator and freezer door seals and fit automatic closers	1900	1400
Fit time and temperature controls to space heaters	6000	1000
Total	14 700	13 300



CASE STUDY 2 – ROYAL LOGISTICS CORPS (FOOD SERVICES)

Since the early 1990s the Army, in its many catering establishments, has been reducing energy consumption by improving kitchen management and organisation and by using equipment more efficiently.

This approach to energy saving required minimal investment yet has achieved savings of at least 20%, with some kitchens achieving savings well in excess of 30%.

The key to this achievement is progressive energy management training linked to the provision of accurate energy consumption data for the kitchen. This is provided by a kitchen energy management system (KEMS), a sub-metering device that measures both gas and electricity used over a 24-hour period, and provides a printout at 30-minute intervals.

The KEMS unit is simple, robust and reliable, and to date 250 have been installed, with a further 250 potential sites identified, both in the UK and abroad.

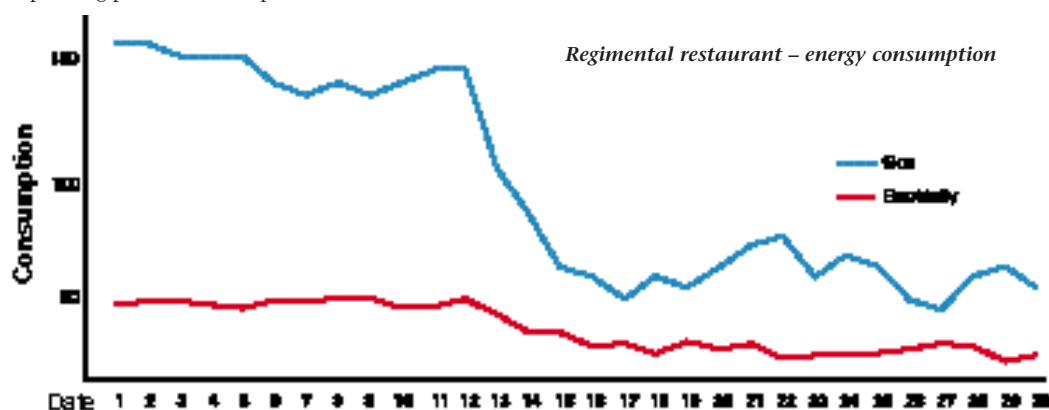
In 1992 the Royal Logistics Corps was awarded the Supreme Award in the 'British Gas Awards for Defence Efficiency' for its KEMS project.

Overall kitchen energy savings of at least £0.5 million per year should be realised from this project.

Example

In a typical small headquarters kitchen, serving three meals a day to about 45 soldiers, a KEMS unit was installed, at an all-in price of £3500, for survey and installation.

The KEMS unit was allowed to run 'silent' for two months so that normal energy consumption figures were established as a base line, and details of operating procedures and practices were obtained.



An intensive 48-hour training session then followed for all of the catering staff, to cover areas including:

- energy-efficient cooking methods
- catering equipment warm-up times
- the correct use of the KEMS and the methods of recording and reporting data
- basic energy-efficient practices, including the publishing of kitchen energy efficiency instructions, turning equipment off when not in use, batch cooking, etc
- the benefits of energy efficiency, both financial and environmental.

A target energy consumption reduction of 20% was set and the staff were allowed to devise new working practices to achieve this target without jeopardising staff safety or quality of service. A degree of competitive rivalry was generated between different shifts and departments, resulting in even greater reductions.

Within a short time, energy consumption had been reduced by well over 30%, as shown in the graph below – training taking place in weeks 13-14.

The initial KEMS investment achieved savings of over £1100 per year producing a payback of just over three years, with the additional benefits of a better working environment for catering staff, reduced maintenance and increased life expectancy of the catering equipment.

The KEMS report is used as a daily management tool and the energy-saving initiative is maintained by a requirement to report, on a regular basis, consumption data relative to target levels.



Monitoring and targeting (M&T)

This case study clearly demonstrates the potential energy savings to be made by the adoption of M&T, allied to a critical review of working procedures and practices.

This technique could be adopted and applied in any kitchen, irrespective of size and catering sector.

CASE STUDY 3 – DONINGTON THISTLE HOTEL

Following a 3-day course in energy management, the chief engineer of the Donington Thistle Hotel, John Swapp, set about implementing a number of no-cost and low-cost energy-saving measures in the hotel.

Key to this initiative was training the hotel's catering staff in how they can save energy in the kitchen without compromising quality standards or customer service. The training programme is repeated every three months to take account of staff turnover.

Operational improvements

- Catering equipment is now switched off immediately after use. Previously, ovens and grills were switched on at 6.00 am and off at 11.00 pm, wasting energy and creating a very hot working environment.
- A gas sub-meter has been installed to measure kitchen gas use, and an electricity sub-meter is planned.
- Gas consumption is displayed graphically in the staff canteen, and gas, electricity and water usage are monitored monthly. Comparisons are made against an index of activity.
- Prizes are awarded for energy-saving suggestions from staff.
- Reduced running time of equipment has produced other savings, such as a reduction in maintenance required and fewer spare parts purchased.

Catering equipment

- All appliance purchasing is now subject to an 'energy efficiency performance rating' examination. One example is that deep fat fryers currently heated electrically will be replaced by modern gas-fired models.
- The existing dishwasher was modified to reduce power consumption. The modification prevents simultaneous use of the rinse tank heater and the main tank heater, by the incorporation of an electrical interlock. This alteration not only reduced unit power consumption but also reduced the maximum demand, with its associated electrical tariff costs.

- Staff have been instructed not to use the dishwasher unless it is fully, or near fully, loaded.
- A 24 kW electrically powered steamer has been replaced by a modern gas-fired model, which consumes less energy at a lower unit price.

Kitchen services

- The customary practice of leaving soiled pans and utensils under running hot water, to soften and release food residues, has been stopped. Now, soiled pans are left to soak in a sink filled with hot water, with the taps turned off. This has significantly reduced gas consumption for hot water generation, as well as water use.
- An uncontrolled space-heating coil in the kitchen has been isolated, as heat from cooking activities is sufficient to meet space-heating needs.
- All canopy lamps in the kitchen have been changed from tungsten light bulbs to compact fluorescent lamps. These lamps reduce electricity consumption by 80% and have a lamp life 10 times longer than the conventional tungsten bulb.
- A feasibility study has been initiated on heat recovery. At present extract fans remove large amounts of air from the cooking area, causing cooler air to be drawn in from the adjoining corridors. A filtered cool air recirculation system is being considered to reduce energy consumption and maintain staff comfort levels.



Overall achievements

- Kitchen gas consumption has been reduced from 250 MWh/month to 150 MWh/month – a 40% reduction, worth approximately £12 000 per year.
- The kitchen is now cooler and provides a more pleasant working environment.
- Staff morale has improved by seeing and feeling the results of improvements made.



The following organisations have provided information for this document and are useful contacts.



European Catering Association

Bourne House
Horsell Park
Woking
Surrey GU21 4LY
Tel 01483 765111
Fax 01483 751991



**The Association of Catering Equipment
Manufacturers and Importers**

Carlyle House
235/237 Vauxhall Bridge Road
London SW1V 1EJ
Tel 0171 233 7724
Fax 0171 828 0667



**Catering Equipment Distributors
Association**

7 Stafford Place
Weston-super-Mare
Somerset BS23 2QZ
Tel 0956 701248
Fax 01934 641175



**Hotel and Catering International
Management Association**

191 Trinity Road
London
SW17 7HN
Tel 0181 672 4251
Fax 0181 682 1707



Inserts

- 1 **HM Prison Lincoln**
- 2 **Royal Logistics Corps
(Food Services)**
- 3 **Donington Thistle Hotel**
- 4 **Timers Save electricity
at Swiss cafeteria
(Caddet Report 265)**

ARCHIVED DOCUMENT

FURTHER READING

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Chartered Institution of Building Services Engineers.

- Applications Manual 10. 'Natural Ventilation in Non-Domestic Buildings'.
- Technical Memorandum 13 'Minimising the Risk of Legionnaires' Disease'.

The following BRE publications may be obtained from CRC Communications Ltd

151 Roseberry Avenue, London EC1R 4AX

Tel 0171 505 6622. Fax 0171 505 6606

- IP6/96 People and lighting controls
- EP39 A guide to energy efficient ventilation

DETR ENERGY EFFICIENCY BEST PRACTICE PROGRAMME DOCUMENTS

The following Best Practice programme publications are available from BRECSU Enquiries Bureau (see below for details).

Good Practice Guides

- 156 Energy efficient refurbishment of public houses – catering
- 160 Electric lighting controls – a guide for designers, installers and users
- 189 Energy efficiency in hotels. A guide to cost-effective lighting
- 205 Energy efficient refurbishment of hotels and guesthouses – a guide for proprietors and managers



Energy Consumption Guides

- 13 Energy efficiency in public houses. Guidance on the benefits of energy efficiency in public houses for the brewer, licensee, customer
- 36 Energy efficiency in hotels – a guide for owners and managers

Introduction to Energy Efficiency Booklet

- 2 Catering establishments

Protect our Environment – Save Energy. A Guide to managing Energy in Hotels (SAVE)

The Department of the Environment, Transport and the Regions' Energy Efficiency Best Practice programme provides impartial, authoritative information on energy efficiency techniques and technologies in industry and buildings. This information is disseminated through publications, videos and software, together with seminars, workshops and other events. Publications within the Best Practice programme are shown opposite.

For further information on:

Buildings-related projects contact:
Enquiries Bureau

BRECSU

BRE
Garston, Watford WD2 7JR
Tel 01923 664258
Fax 01923 664787
E-mail brecsuenq@bre.co.uk

Internet **BRECSU** – <http://www.bre.co.uk/brecsu/>

Internet **ETSU** – <http://www.etsu.com/eebpp/home.htm>

Industrial projects contact:
Energy Efficiency Enquiries Bureau

ETSU

Harwell, Oxfordshire
OX11 0RA
Tel 01235 436747
Fax 01235 433066
E-mail etsuenq@aeat.co.uk

Energy Consumption Guides: compare energy use in specific processes, operations, plant and building types.

Good Practice: promotes proven energy efficient techniques through Guides and Case Studies.

New Practice: monitors first commercial applications of new energy efficiency measures.

Future Practice: reports on joint R&D ventures into new energy efficiency measures.

General Information: describes concepts and approaches yet to be established as good practice.

Fuel Efficiency Booklets: give detailed information on specific technologies and techniques.

Introduction to Energy Efficiency: helps new energy managers understand the use and costs of heating, lighting etc.

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